would eventually lead. During this period, too, he carried on an investigation on Madura Foot, and compared mycetoma with actinomycosis; this paper appeared in the *Journal of Pathology* and in the *Transactions* of the Pathological Society. In 1892 Dr. Kanthack became medical tutor at the Royal Infirmary, Liverpool, and in order that his bacteriological training might be utilised, a special demonstratorship of bacteriology was founded for him. The following year the authorities at St. Bartholomew's Hospital retained Dr. Kanthack's services as director of the Pathological Department in the School and Hospital and Lecturer on Pathology and Bacteriology; and a year later gave him the appointment of Curator of the Museum. In addition to the teaching and routine work of this period he contributed numerous notes and observations to the *Transactions* of the Pathological Society, and, probably for the purpose of systematising his teaching work and saving time in the explanation of details, he in 1894 published, in conjunction with Dr. Rolleston, a "Manual of Practical Morbid Anatomy"; and in the following year, along with Dr. Drysdale, a work on "Practical Bacteriology." Both these works give evidence of wide reading and of an accurate knowledge of literature thoroughly up to date. When Prof. Roy became so ill that it was evident that he could no longer carry on his professorial work, and in all probability would never again be able to take up the duties of his chair, Dr. Kanthack was appointed Deputy Professor of Pathology. The work of this post he carried on simultaneously with his duties at St. Bartholomew's Hospital, making the return journey between London and Cambridge several times a week. This, for a man who, a short time before, had recovered from a severe attack of typhoid fever, involved a very great physical strain; and early in 1897 Dr. Kanthack resigned his post at St. Bartholomew's and gave undivided attention to his work in Cambridge, where, on Prof. Roy's death, he was appointed Professor of Pathology.

Of Prof. Kanthack's influence on the study of pathology and bacteriology in this country, it is as yet too early to speak, though there can be little doubt that, apart from the work that he himself initiated, that of his pupils must ultimately leave a deep impress on the scientific medicine of our time and that immediately to follow. In many ways Prof. Kanthack was an ideal teacher. He exerted great personal influence over the young men who were brought into contact with him. His reading was very wide, so that, possessing a retentive memory, he was able to store up an enormous amount of accurate information which he could always bring to bear on the work that he had in hand. He was thus able to make a profound impression on his pupils. He had a sufficient amount of dogmatism in his manner and method to inspire them with confidence in his teaching, and to give those who were looking to him for guidance a sheet-anchor to which they might hold until they were thoroughly able to take their bearings for themselves. From his extensive reading, too, which, as already indicated, was always kept well up to date, he was able to determine at once what special points remained to be worked out in connection with the various subjects occupying the attention of the scientific world; whilst his keen critical faculty enabled him to mark the flaws in experiment or argument in published work that came under his notice, so that he was always able to set his pupils on to work which should shed some new light on the various questions attacked, and to gather facts and information which would help him in the solution of the problems on which he himself was engaged. Those of his pupils who knew him best regarded him with feelings of the deepest affection—to them the loss is intensely personal. In 1895 Prof. Kanthack married a Liverpool lady—Miss Lucie Henstock—the daughter of the late John Henstock, Esq., of Liverpool.

NOTES.

IN retiring from the presidential chair of the Paris Academy of Sciences, at the meeting on January 2, M. Wolf referred to the changes which had occurred in the list of members and correspondants during last year. In the section of geometry, Prof. Cremona was elected correspondant in succession to Prof. Brioschi. The section of astronomy lost M. Souillart, and the two vacancies caused by his death and that of Dr. Gould, have not yet been filled up. There is a vacancy in the section of geography and navigation, caused by the death of M. Manen, and also a vacancy in the section of chemistry, caused by the death of Prof. Kékulé. In the section of mineralogy, M. Depéret was elected to succeed the late M. Pomel, and Prof. Marsh to succeed the late Prof. Hall. There are two vacancies in the section of botany, one caused by the death of Baron von Mueller. The section of rural economy has lost Marquis Menabrea and M. Demontzey by death, and the vacancies have not yet been filled up. Two vacancies also exist in the section of anatomy and physiology, on account of the deaths of Prof. Lovén and Prof. Steenstrup. In the section of medicine and surgery Prof. von Leyden has succeeded Prof. Virchow, who has been elected foreign associate of the Academy; and Prof. Mosso has succeeded the late Prof. Tholozan.

THE Council of the Royal Institute of Public Health have awarded the Harben Gold Medal for 1899 to Lord Lister, P.R.S., in recognition of his eminent services to preventive medicine. Prof. William R. Smith, who has been appointed Harben Lecturer for the year 1899, has chosen "Diphtheria" as the subject for his lectures.

A REPORT has reached us from Mr. L. Small, of Denver, of the discovery of a huge fossil Dinosaur that must have been about 130 feet in length. The remains were found by Prof. W. H. Reed, of Wyoming, in Jurassic strata, near Laramie, and indicate an animal much larger than any form that has been previously obtained.

IN addition to the New Year honours referred to last week, Sir Charles Cameron, medical officer of health for the City of Dublin, has had the Order of C.B. conferred upon him.

FATHER RODRIGUEZ DE PRADA has been appointed director of the Vatican Observatory.

THE annual general meeting of the Royal Meteorological Society will be held on Wednesday next, January 18, when the report of the Council will be read, the election of Officers and Council for the ensuing year will take place, and the President (Mr. F. Campbell Bayard) will deliver an address on "The government meteorological organisations in various parts of the world."

ON Tuesday next (January 17), Prof. E. Ray Lankester delivers the first of a course of ten lectures at the Royal Institution on "The Morphology of the Mollusca." On Thursday (January 19), Mr. A. Savage Landor will begin a course of three lectures on "Tibet and the Tibetans." The Friday evening meeetings of the members will commence on January 20, when Prof. Dewar will deliver a discourse on "Liquid Hydrogen."

THE ninth International Congress of Ophthalmology will meet at Utrecht from August 14 to 18. Only the English, French, and German languages will be employed. There will be three sections—one for anatomy, pathological anatomy, and bacteriology; one for optics and physiology; and one for clinical and operative procedures. There will be a secretary for each language as follows: English, Dr. A. McGillivray, Dundee; French, Dr. A. Dufour, Lausanne; German, Dr. A. Siegrist, Bâle.

BY making use of the exceedingly low temperatures that can now be obtained, a very simple method for exhausting X-ray and other vacuum tubes presents itself. An example of this was given by Prof. Dewar at a recent meeting of the Royal Society, at which he was able to produce an almost perfect vacuum. By dipping the end of a closed tube filled with air into liquid hydrogen, the air quickly condensed at the bottom in a solid form. It then only remained to separate from the rest that part of the tube from which the air had been so removed, by heating and sealing off, and the tube was found to possess an extremely high vacuum. In fact, so perfect was the vacuum that it was difficult to pass an electric current through it. One great advantage of this mode of procedure is that in the above case only one minute was taken to obtain the required result.

WE regret to see, in the *Electrical Review*, the announcement of the death of Dr. Eugen F. A. Obach, at the comparatively early age of forty-six years. He was born in Stuttgart, of Swiss parents. In 1875 he obtained his degree of Doctor of Philosophy at the University of Leipzig. After spending a few years in electrical engineering, Dr. Obach devoted himself mainly to the study of the chemistry of gutta-percha and india-rubber, the result of his extensive and varied knowledge of these substances being embodied in his Cantor Lecture delivered before the Society of Arts. A long abstract of these lectures appeared in NATURE in June last (vol. lviii. p. 136). Shortly after that time his health failed, and even prolonged rest from work brought about no improvement, and he died on December 27 at Graz, Styria. Dr. Obach had been a frequent contributor to the literature of electrical science since 1875, about a score of papers being published in the English and German technical journals or in the *Proceedings* of scientific societies.

DR. REINHOLD EHLERT, distinguished by his studies in seismology, has lost his life by an Alpine accident on the Susten Pass. Among other valuable seismological works, he wrote a treatise on "A comparison, explanation, and critical estimate of the most important seismometers, with special reference to their practical utility." This work was *couronné* by the philosophical faculty of the University of Strasburg, where Dr. Ehlert conducted his investigations.

REUTER reports from Copenhagen that Captain Daniel Brunn has decided to organise an expedition next summer to search for traces of Herr Andrée and his companions in the neighbourhood of Eastern Greenland. The expedition will start from the east coast of Iceland, and proceed by way of Jan Mayen Island to the vicinity of Cape Barclay, on the East Greenland coast.

THE *Pharmaceutical Journal* reports the opening of a chemical and pharmaceutical laboratory in Rajkote, the seat of the Government in the province of Kathiawar, Western India. The building is the gift of Azam Laxmon Meram, who contributed 30,000 rupees for its construction; and its equipment has been provided from the State Joint Fund. The object for which the building has been primarily founded is for improving the practice of native medicine and for making known valuable Indian remedies to Western science, and also to ascertain which native herbs may be made more adaptable to science; and it is hoped that eventually it may further the progress of bacteriology and sanitary science. The director of the laboratory is Mr. H. L. Lee.

THE present position of the Röntgen rays in military surgery was described by Major J. Battersby in a paper read before the Röntgen Society on Tuesday. Major Battersby was selected for service in charge of the Röntgen ray apparatus in the Sudan, where the temperature varied from 100 to 122 degrees F. in the shade; and his paper was based upon his experience in this campaign. After the battle at Omdurman 121 British wounded were conveyed to the surgical hospital at Abadieh. Of that number there were 21 cases in which the bullet could not be found, or its absence proved by ordinary methods. In 20 out of these 21 cases an accurate diagnosis was arrived at with the help of the rays, the odd case, who was suffering from a severe bullet wound in the lung, being too ill for examination at the time. The senior medical officer in charge of the hospital said:—"The Röntgen rays proved of invaluable assistance in localising the exact position of bullets, and in many cases rendered probing of wounds unnecessary. . . . In many cases the X-rays prevented much suffering to the patient, which would have been caused by probing, the use of the finger, or enlarging the wound in the ordinary search for the bullets, as the skiagraph at once indicated the exact position of the bullet. In other more complicated cases the Mackenzie-Davidson method localised the exact position of the bullet, so that the surgeon was at once able to come to the conclusion if operative interference was judicious or otherwise. If considered advisable, the removal of the bullet was much facilitated by the diagram previously indicating exactly where the projectile was to be found." With regard to apparatus, the most serious difficulty at present is the best method of generating the primary electrical current for charging the storage batteries, or working the coil direct. Primary batteries, for many reasons, are unsuitable and not to be recommended. In the Sudan a small dynamo, driven by means of a tandem bicycle, answered admirably, and was readily transported by rail and river to Abadieh; but as at present constructed, it is unsuitable for mule, camel, or human transport. An ideal apparatus would consist in a statical or friction machine, some modification, for instance, of Mr. Winshurst's, by which the focus tube could be excited direct. In such a design many physical difficulties will occur, but they are not insurmountable. If it is achieved, it will enable the present apparatus to be reduced very considerably by dispensing with primary and storage batteries, dynamos, bicycles, and induction coils.

WITH reference to the landslip from the Sasso Rosso, which destroyed several buildings at Airolo on December 27, 1898, the Zürich correspondent of the *Times* states that Swiss geologists are of opinion that the landslip is by no means over, and that a mass of rocks equal to that which fell last week has yet to come away. It is hoped that the detachment will take place in smaller masses, and that no slip exceeding the present (400,000 cubic metres in volume) is to be apprehended. The summit of the Sasso Rosso is 2300 metres above the sea level, and 1200 above Airolo, and the falling rocks reached the village with a velocity of 15 to 20 metres per second. The present danger lies in the rocks which remain suspended on the flank of the mountain. Should these give way, the village and the southern exit of the tunnel would be endangered by the avalanche, a risk which is increased by recent heavy rain and snow. Compared with other similar avalanches, the amount of débris already fallen is not excessive; at Elm the fall exceeded 11,000,000 cubic metres, at Goldau it was 25,000,000, and the historic landslip at Brienz in 1749 was estimated at 50,000,000 cubic metres.

THE New York Zoological Society has issued the third number of its *News Bulletin*, in which the progress of the work of transforming South Bronx Park into a Zoological Park is described and illustrated. Seven months ago the New York Zoological Park was a tract of wild land, but since then several of the animal houses have almost been completed, and other enclosures have been made. New York City has voted 30,000 dollars as a maintenance fund for six months, both for the care of the animals and the care of the Park, and is expending 62,000 dollars in the development of roads, walks, drains, and other ground improvements. It is a matter for congratulation that the Zoological Park appears to have become one of the established institutions of the City of New York. The magnificent site, and the fine buildings and enclosures which will eventually be erected upon it, will give the people of the metropolis of Greater America reason to be proud of their Zoological Park.

DR. ROBERT MUNRO writes to the *Glasgow Herald* with reference to the archæological remains recently discovered in the estuary of the Clyde (see NATURE, vol. lviii. p. 488), and with which his name has been associated. He desires it to be known that he does not endorse the opinions that have been promulgated as to the age, structure, and marvels of the Dumbuck crannog, for he regards it neither as a pile-structure nor as a monument of Neolithic times.

THE curator of the Perak Museum at Taiping reports in the Blue Book on the Straits Settlements (C-9108 of 1898) that the museum is now overcrowded, and that there is consequently much difficulty in arranging the collections in their natural sequence, while there is practically no room for new specimens. The Taiping collections are specially rich in the ethnological and mineralogical branches, and the zoological specimens have recently been greatly improved. The photographic and botanical branches were extended during the year, and the museum now contains a valuable section allotted to economic botany. Investigations were carried out, with satisfactory results, on the subject of insects attacking coffee, rice, and other agricultural products, and some experiments were made in connection with tapping rubber. Discussion has been going on as to constituting the museum at Taiping a central museum, supported by all the Federated Malay States. The curator at Taiping suggests that local museums, of which one has been in existence for several years in Selangor, and which, it is to be hoped, will soon be established in the other States, might either be affiliated to, or form branches of, the Federal museum. On the other hand, the British Resident at Selangor urges that the existence of a local museum creates and sustains in the minds of the community an interest in local products, their sources and uses, which cannot fail to be beneficial and deserving of encouragement, and it cannot be argued that people in Selangor or the Negri Sembilan will obtain any advantage from a museum in Perak, however complete, which few of them will probably ever see.

THE January number of the *Reliquary and Illustrated Archaeologist* contains a note on a paper recently read before the Society of Antiquaries by Mr. P. Norman, on the discovery, at Millfield, Keston, Kent, of a shallow, circular pit containing nearly a thousand chips, flakes, and cores of flint. Mr. Norman drew attention to the fact that a very large proportion of the well-shaped flakes had lost their pointed end, consisting of about one-fourth or one-third part of the entire flake. This had evidently been broken off purposely, and, as none of the points were found among the débris, while many butt-ends remained, it seemed probable that the flakes were produced for the sake of their points. These were broken off and used as arrow-heads, or for some purpose requiring sharp angular points, and thus dispersed about the surface of the surrounding country. A number of cores from which the flakes had been struck, and some large pebbles which had apparently served as hammers for detaching the flakes therefrom, were found lying among the fragments of flint on what must have been the floor of a Neolithic workshop. The hut in which this ancient industry was carried on was about fourteen feet in diameter, and its site was found under an accumulation of earth about two feet thick. Evidence was given that the Millfield pit formed one of the remarkable group of Neolithic hut circles on Hayes Common, some of which had been excavated and described ten years ago by Mr. George Clinch.

TO determine the probable meteorological conditions likely to prevail along the path of the total eclipse of the sun, which will occur in the Southern States of America on May 28, 1900, Prof. F. H. Bigelow obtained observations of the state of the sky, and other meteorological conditions along the path of totality, for the period from May 15 to June 15 in the years 1897 and 1898. The results for the former year have already been referred to (vol. lvii. p. 159), and those for the year 1898, containing reports from eighty-seven stations, are given in the latest number of the *Monthly Weather Review* (September 1898). Last year's observations give precisely the same result as was obtained in 1897, namely:—The weather conditions in the interior of Georgia and Alabama were better than in Virginia, North Carolina, South Carolina, Mississippi, and Louisiana; and it would be much safer for the eclipse expeditions to locate their stations in the northern portions of Georgia and Alabama, upon the southern end of the Appalachian Mountains, where the track crosses the elevated areas, than nearer the coast-line in either direction north-eastward towards the Atlantic coast, or south-westward towards the Gulf coast; on the coast itself the weather is more unfavourable than in any other portion of the track.—The inquiry will be repeated during May and June of the present year.

THE reports issued by the Meteorological Office show that, notwithstanding the stormy character of the weather during December, and the almost continual succession of atmospheric disturbances which reached our coasts from the Atlantic during the latter part of the month, the rainfall during that period was only in excess of the average in the north of Scotland, the north of Ireland, and the southern and central parts of England. In the Hebrides, which experienced the full force of many of the storms, the excess was most marked, rain having fallen at Stornoway on every day of the month, on five occasions the fall exceeding an inch, and the total amount measured being little short of 15 inches, or more than 9 inches above the average. There was a considerable deficiency in the east and west of Scotland and the north-east and north-west of England. Reckoning from the beginning of the year, the only marked excess above the average is 16 inches in the north of Scotland. In all other districts, except Ireland, there is a considerable deficiency, the greatest being about 7·6 inches in the south of England.

THE "enclosed" type of alternate-current arc-lamp is much steadier in burning than its predecessors, it is therefore particularly well suited to photographic investigations as to the nature of arcs in general, using rapidly moving photographic plates. Mr. N. H. Brown, in the *Physical Review*, vol. vii. pp. 210–216, 1898, describes his experiments made with an "enclosed" arc. The pictures obtained are not simply broad discontinuous bands of light; they exhibit, as a rule, a symmetrical arrangement of bright patches, in more or less regular alternation, the second patch being "reversed" to the first—like its image seen in a plane mirror. The front end of each patch makes an appreciable angle with the diameter of the plate, representing that the arc starts from one side, and then from the other, successively. The shape of the back ends of the bright patches indicates that the light dies out first near the carbons, and later near the middle of the arc-space. The shape of the back and front ends of the bright patches does not seem to depend upon whether the current curve is or is not a true sine function.

PROF. JAMES S. STEVENS'S "Study of various styles of cross-wires," in the *Journal of Applied Microscopy* for October, deals with a subject of such importance in astronomical and other observations, that a short *résumé* of the conclusions may even now be of interest. Four styles of crossed wires were experimented on; in the first, the intersection of two wires forming an **X** is brought into coincidence with the given fixed line; in the second, one wire is superposed on the line; in the third, this line bisects the space between two parallel lines; and in the fourth, the reference line is adjusted at one side of the movable parallel lines at a distance from one of them equal to their distance apart. Four observers were selected, each being required to make twelve settings with either arrangement; firstly with time unlimited, secondly with time limited to two or three seconds, and thirdly with each of the four settings taken in alternation. The probable error of the mean of each group of twelve observations was calculated by the Theory of Least Squares. With one exception the method of intersecting wires is found to give by far the largest probable error, and may easily be classed as the poorest method. When the reference mark upon which the wires are to be set is of the same order of magnitude as the movable wire, the method of superposing one upon the other gives the best results. Lastly, when the reference mark is larger, such, for example, as the lines on a graduated scale, the third or fourth method should be used, the choice between these two depending upon the observer. It is thus remarkable that the cross-wire arrangement adopted in the older transit circles should be so inferior to other arrangements.

IN some notes on the geology of Syria (*Bericht der Senckenb. naturf. Gesellsch.*, Frankfurt, 1898), Dr. F. Kinkelin records fossils from the Cretaceous and Eocene formations in a number of localities. It is well known that in Palestine strata from the base of the Upper Cretaceous to the Nummulitic limestones form one great geological group, and it may be judged from the facts made known by Dr. Kinkelin that a corresponding series occurs in northern and central Syria. A new species (*Cardium Dayi*) is described from strata yielding *Inoceramus concentricus* and *Vola* (*Pecten*) *aequicostata.*

REMAINS of fossil Jerboa (*Alactaga saliens fossilis*) have been described, by Dr. A. Nehring, from the Pleistocene strata of Westergeln, between Magdeburg and Halberstadt (*N. Jahrbuch f. Mineralogie, &c.*, 1898, Bd. II.)

THE development of the pattern of the wings of butterflies in the pupa forms the subject of a paper by Countess M. von Linden, in the *Zeitschrift für wissenschaftliche Zoologie*, Band 65, Heft I. The principal species discussed, and illustrated in the three plates which accompany the article, are *Papilio podalirius* and *machaon*, *Thais polyxena*, and *Vanessa levana* and *urticae.* This paper is followed by one upon a similar subject, by Dr. M. Baer, who discusses the structure and coloration of the wing-scales in butterflies. The author recognises three different classes of colour, viz. (1) pure colours, due exclusively to pigment; (2) optical colours, due to refraction; (3) mixed colours, due to the effects of pigment and refraction combined.

THE *Proceedings* of the tenth annual meeting of the Association of Economic Entomologists (U.S. Department of Agriculture, Division of Entomology, *Bulletin* No. 17, New Series) include a variety of short papers on insects of various orders, and the best means of destroying them. Prof. Howard's observations on the ease with which Chalcid parasites of *Coccidae* can be introduced from one country to another, are of considerable importance. There is also a paper by Mr. T. D. A. Cockerell, on "Entomological Ethics," containing some suggestions which may not be unworthy of the attention of those who are responsible for the management of museums and other public collections.

AMONGST the botanical papers read at the last meeting of the American Association for the Advancement of Science is one by Dr. Erwin F. Smith, describing some observations he has made on an organism recently isolated from and believed to be responsible for a disease which appears in sweet corn. It was originally found by Stewart occurring in enormous numbers in the vascular bundles of corn, making the leaves flabby or shrivelled. It is a motile bacillus and is provided with one polar flagellum, and grows in all ordinary culture media, producing a yellow colour both in the latter and in the host plant. It grows best in the presence of cane-sugar, and very striking differences are observed when it is inoculated on to slices of turnips and slices of beetroot respectively, the growth being ten to fifty times as abundant in the case of the latter. In this characteristic may possibly be found an explanation of why sweet corn is attacked in preference to common corn. It has been found in New York and Michigan States, and may be looked for, says its discoverer, in all parts of the United States.

DR. G. AGAMENNONE has contributed to the *Atti dei Lincei* (vii. 11) some interesting statistics relating to the earthquake at Hayti on December 29, 1897. The position of the epicentre was roughly in latitude 19½° N., longitude 71° W. As mentioned in a former note in NATURE, Dr. Agamennone had previously found considerable difficulty in calculating the velocity of propagation of the Labuan shock, which he attributed to the differences in sensitiveness of the instruments by which it was recorded at various stations. That this explanation was the correct one, is confirmed by analogous observations connected with the Hayti earthquake. Thanks to the existence of a Cecchi seismograph at Port-au-Prince, whose readings could be compared with those taken at Catania and Ischia, the velocity of propagation of different waves was calculated, and was found in no case to reach 10 kilometres per second; and the swiftest waves, probably longitudinal in character, were followed by waves of long period whose superficial velocity seems to have averaged 3 kilometres per second. But it is pointed out that in the absence of the Port-au-Prince Observatory, a comparison of the records made at Toronto and in Europe would have given improbably high values for the velocity of propagation, consequent upon the Toronto instrument being insensible to the first waves which affected the European seismographs.

THE buildings of Oxford, from an engineer's point of view, form the subject of an illustrated article in the January number of the *Engineering Magazine.*

A BRILLIANT heliogravure of Dr. Sidney Coupland, recently appointed Commissioner in Lunacy, appears in the *Middlesex Hospital Journal.* Dr. Coupland has been connected with Middlesex Hospital for many years, in the department of pathological anatomy.

AN instructive description of the great boulder of gypsum, recently found at Great Crosby, is given by Mr. T. Mellard Reade in a pamphlet, a copy of which has been sent to us. A picture of the boulder upon the pedestal erected for it by the District Council of Great Crosby, forms the frontispiece of the pamphlet.

THE new volume of the *Geographical Journal*, containing the six monthly parts from July to December 1898, has been published. Like previous volumes, the present one is filled with interesting papers read before the Royal Geographical Society, articles on topics of geographical importance, a monthly record of contributions to geography in various parts of the world, an invaluable bibliography of current geographical literature, lists of new maps, and numerous coloured maps to illustrate the contents.

A COPY of the second number of the *Zambesi Mission Record* has been sent to us. The periodical is to be published about four times a year, and is concerned with the Catholic missions in the area under the rule of the British South Africa Company, north and south of the Zambesi. Among the articles in the present number is a very interesting one on some South African beetles, by the Rev. J. O'Neil, S.J., illustrated by photographs of the chief species described. The magazine can be obtained from the Rev. A. M. Daignault, 114 Mount Street, London, W.

THE annual report (new series, vol. ix.) of the Geological Survey of Canada, referring to the operations of the Survey in 1896, has been received. The volume comprises 816 pages. It is accompanied by five maps and illustrated by twenty plates, besides a number of figures in the text. The several parts composing the volume have been issued separately, and most of them have been referred to in these columns. Dr. George M. Dawson's summary report, occupying 144 pages, shows that the Canadian Survey accomplished work of great economic importance in 1896, and added to scientific knowledge by original observations and deductions, and by exploration of new ground in the field.

A SERIES of monthly star maps has been prepared by Mr. Walter B. Blaikie, and issued by the Scottish Provident Institution in a blotting-book. There are two maps for each month, one showing the aspect of the sky in the latitude of London, at 10 p.m., when looking north, and the other the southern aspect. The stars are printed in gold on a blue ground, and the positions of the chief planets visible are indicated. In addition to the maps, which will enable beginners easily to find their way among the constellations, a number of notes on interesting astronomical objects are given by Mr. Blaikie. The idea of issuing maps of this kind from an assurance office is an excellent one, and it has been well carried out.

WE have received the *Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften*, Vienna, containing papers presented to the section of mathematics and natural sciences during the period from January 1897 to March 1898. The report is divided into four parts, referring to different branches of science, and each part is published in several divisions. The first part contains papers on natural sciences; the second comprises (*a*) papers on mathematics, astronomy, physics, meteorology, and mechanics, and (*b*) papers on chemistry; and the third part contains papers on anatomical and physiological subjects, excluding purely medical matters. Many of the papers have already been referred to in these columns, and with the others now before us they make a valuable addition to scientific knowledge.

THE question as to the best means of isolating a freezing mixture is one of considerable practical importance in chemical and physical work. In the current number of the *Berichte*, Prof. W. Hempel describes a series of comparative experiments undertaken by him to settle which substance was most suitable for ordinary work. Starting with a temperature of about −75° to −80° C., produced by solid carbon dioxide and ether, the rate of rise of temperature with time was measured, and, as a result, eiderdown was found to be the best insulator, wool carefully dried at 100° C. being nearly as good, and having the advantage of cheapness. Three samples of vacuum tubes, of the pattern invented by Prof. Dewar, were also tried, and were found to give very varying results amongst themselves, and all being much inferior in insulating power to either eiderdown or cotton wool. Thus with eiderdown a rise of 12° C. occurred in eighty-eight minutes, with dry wool a rise of 20° to 24° C. in the same time, whilst the three vacuum-jacketed tubes gave under the same conditions rises of 65°, 69°, and 39° respectively. The results would seem to show that trustworthy Dewar tubes cannot be bought commercially.

THE additions to the Zoological Society's Gardens during the past week include a Huanaco (*Lama huanacos*, ♂) from Punta Arenas, presented by Mr. Henry F. Fox; a Crossbill (*Loxia curvirostris*), European, presented by Mr. H. O. Blanford; two Delalande's Geckos (*Tarentola delalandi*) from West Africa, presented respectively by Mr. Percy Leach and Mr. H. Munt; three Grey Squirrels (*Sciurus cinereus*) from North America, two Dorsal Squirrels (*Sciurus hypopyrrhus*) from Central America, three Nose-crested Iguanas (*Iguana tuberculata rhinolophus*) from Nicaragua, a —— Iguana (*Iguana*, sp. inc.) from Tropical America, deposited; a Leopard, Black variety (*Felis pardus*), from Africa, three Brazilian Caracaras (*Polyborus brasiliensis*) from South America, two Warty-faced Honey-eaters (*Xanthonyza phyrgia*) from Australia, purchased.

OUR ASTRONOMICAL COLUMN.

COMET CHASE.—This comet, which is a faint object and difficult to observe, has the following ephemeris for the present week:—

Ephemeris for Berlin Midnight.

1899.	R.A. (app.). h. m. s.	Dec. (app.). ° ′
Jan. 13	11 8 48	+30 54·6
15	9 15	31 17·9
17	9 35	31 41·2
19	9 48	32 4·6
21	11 9 55	+32 27·7

Its brightness is now about the same as that at the time of its discovery, and is on the decrease.

ARTIFICIAL MOON MARKINGS.—Mr. S. H. R. Salmon has sent to us a series of slides which are of great interest, since they appear to represent portions of lunar landscapes, and are astonishingly like the real photographs of them. In fact, among all artificial methods of trying to produce lunar effects without the intervention of any hand work this is, as far as we know, the most successful. The process Mr. Salmon employs is very simple and can be easily repeated by any one. It is only necessary to smear a little paste on to a glass slide, and gently warm it from below with a spirit-lamp until it is dry. Observing it then with a microscope, we are confronted with this lunar-like appearance. The slides which we have before us represent many variations of lunar formations. In this one we see a small craterlet on the wall of a large crater, while in another we have rills widening now and again into craterlets. In a third slide we have a large crater, very like some on the moon, showing beautifully the gradation of tone on the surrounding wall. All the markings are, as Mr. Salmon states, perfectly accidental, and can be seen with the microscope. The slides before us are the result of a first attempt at micro-photography on the part of Mr. Salmon, and he is to be congratulated on obtaining such excellent results.

A NEW DOME FOR EQUATORIALS.—The natural evolution in the construction of domes under which equatorials are housed is the elimination of the shutter. Shutters, if they are not perfect, are the causes of so many evils in an observatory, for they may leak, jam, break, and in several other ways do indirectly damage to a valuable instrument. There are several ways in which a dome can be erected and found to work satisfactorily without their presence, and one, set up at Greenwich in 1891 for a transit instrument, has met with marked success. In this case the dome consists of two halves, and as the aperture is required only in the meridian, these are made to roll back one east and the other west. More recently the idea has been extended to the new altazimuth, also at Greenwich; but here the halves are mounted on a ring girder, to allow the aperture to take up any required azimuth. In both these cases the openings had parallel sides.

A later modification for equatorials, due to Messrs. T. Cooke and Sons, of York, is described and illustrated in the current number of the *Observatory* (January), and here the opening is wedge-shaped. The arrangement, as described by the makers, is the following.

"Our object was to do away with the usual shutter covering an opening in the dome. To carry this into effect, the dome is